CLAIMS

1. A method of manufacturing bent glass sheets, in which glass sheets (1) are brought to their softening temperature, then they are caused to travel over a shaping bed (6) consisting of elements (7) for advancing them which are arranged along a path having a circular arc-shaped profile, the sheets being bent in their direction of advance over the bed according to the radius of curvature of the bed and also being able to be bent in the direction transverse to the preceding direction depending on the shape chosen for the advancing elements, the sheets progressively assuming their shape on entering the shaping bed (6) and over a first zone (5), termed shaping zone, then being hardened by tempering or cooling in a second zone (8) of the shaping bed (6) until they leave, and then the bent glass sheets thus obtained are recovered, characterized in that a shaping bed (6) is produced with a profile extending in a circular arc of more than 90° and in that, on leaving the shaping bed (6), the hardened glass sheets (1) are moved in a direction opposite that in which they were fed in.

2. The method as claimed in claim 1, characterized in that the glass sheets (1) are brought horizontally to the shaping bed (6), and in that they are also conveyed horizontally on leaving the shaping bed (6).

3. The method as claimed in either of claims 1 and 2, characterized in that the glass sheets (1) are caused to travel along a flat trajectory in a heating furnace (2) so as to bring them to the softening temperature, then along the curved trajectory of the shaping bed (6), tangential to the aforementioned flat trajectory.

4. The method as claimed in either of claims 1 and 2, characterized in that a prior bending operation is carried out by sagging the glass sheets (1) brought to

their softening temperature before causing them to travel over the shaping bed (6).

5. The method as claimed in one of claims 1 to 4, characterized in that the glass sheets (1) are caused to travel over the shaping bed (6) along an ascending path, backing rollers (9) being associated with the forwarding elements (7) of the shaping bed (6) in every zone thereof in which the sheets (1) need to be retained, and in that each hardened glass sheet (1) is overturned on release from the last roller (7)/backing roller (9) pair associated with the shaping bed (6), the sheets (1) thus overturned being received by a conveyor belt (15) and then taken over by a roller conveyor (12) with the aim of transferring them toward the exit point.

6. The method as claimed in claim 5, characterized in that a hardened glass sheet (1) is overturned by causing it, on its release, to be projected under the effect of its speed so that it strikes, by way of its front lower end edge (16), against the upper part of an idle roller (14) whose axis is parallel to that of the forwarding elements (7) of the shaping bed (6), the hardened glass sheet (1) then tilting about this line of contact with the idle roller (14) under the effect of its weight so that it to drops onto the reception conveyor belt (15) in the overturned state.

7. The method as claimed in claim 5, characterized in that a hardened glass sheet (1) is overturned by causing it, on its release, to be projected under the effect of its speed so that is applied, by way of its lower face, to a roller (14a), preferably an idle roller, whose axis is parallel to that of the forwarding elements (7) of the shaping bed (6), by blowing air under the sheet (1) in the region situated upstream of its line of contact with said roller (14a), in order to tilt said hardened glass sheet (1) about

said roller (14a) so that it drops down onto the reception conveyor belt (15) in the overturned state.

8. The method as claimed in one of claims 1 to 4, characterized in that the glass sheets (1) are caused to travel over the shaping bed (6) along a descending path, backing rollers (9) being associated with the forwarding elements (7) of the shaping bed (6) in every zone thereof in which the sheets (1) need to be retained, and in that the hardened glass sheets (1) are recovered on leaving the shaping bed (6) by being simply deposited on a conveyor belt and then taken over on a roller conveyor (12) or by being directly deposited on a roller conveyor with the aim of transferring them toward the exit point.

9. The method as claimed in one of claims 5 to 8, characterized in that perforated or multi-strap conveyor belts (15) are used so as to allow cooling by blowing in air from underneath onto the lower face of the transported glass sheets (1).

10. The method as claimed in one of claims 1 to 9, characterized in that the advancing elements (7) of the shaping bed (6) are chosen from among rods having an axis of symmetry, such as cylindrical, conical and waisted/barreled rods, and rotating on themselves, and cambered or curved elements which are surrounded by rotating tubular sleeves, the shapes of said advancing elements being able to change along the shaping zone of the shaping bed (6).

11. The method as claimed in one of claims 1 to 10, characterized in that the bending operation is carried out with a radius of curvature of the shaping bed (6), that is to say of a line parallel to the direction of travel, of 1 to 2 meters, and a radius of curvature of a line perpendicular to the direction of travel of 5 meters to infinity.

12. The method according to one of claims 1 to 11, characterized in that glass sheets (1) which have assumed their shape at a temperature of 600 to 700°C are caused to travel.

13. The method as claimed in one of claims 1 to 12, characterized in that the glass sheets (1) are subjected to tempering in the tempering zone (8) of the shaping bed (6) by exposing them to air at a pressure of 0.98×10^4 Pa to 2.94×10^4 Pa (1000 to 3000 mm water column).

14. The method as claimed in one of claims 1 to 13, characterized in that air is blown in continuously over at least one face of the glass sheets having begun to be shaped and before they enter the cooling or tempering zone (8), under conditions capable of asymmetrically influencing the final concavity of the bent glass sheets (1) by comparison with the concavity that the final bending would have given without said blowing.

15. The method as claimed in one of claims 1 to 14, characterized in that the bending operation is carried out on glass sheets (1) having a thickness of 1 to 6 mm.

16. The method as claimed in one of claims 1 to 15, characterized in that the distance between the glass sheets (1) on the shaping bed (6) is adjusted to a value of 2 to 20 cm.

17. The method as claimed in one of claims 1 to 16, characterized in that the hardened bent glass sheets (1) are obtained at a rate of at least one sheet every four seconds, in particular of one sheet per second.

18. A machine for bending glass sheets comprising

means for causing glass sheets which have been brought to their softening temperature beforehand to travel over a shaping bed (6) consisting of elements (7) for advancing them which are arranged along a path having a circular arc-shaped profile, characterized in that the shaping bed (6) extends over a circular arc of more than 90°, and in that means are provided for taking over the bent glass sheets (1), on leaving said shaping bed (6), in a direction opposite that in which they were fed in.

19. The machine as claimed in claim 18, in which the path of travel of the glass sheets (1) is designed to be ascending, characterized in that the means for taking over the glass sheets (1) comprise means (14; 14a) for overturning the latter before they are recovered on a conveyor belt (15).

20. The machine as claimed in claim 19, characterized in that the overturning means consist of an idle roller (14) whose axis is parallel to that of the forwarding elements (7) of the shaping bed (6), arranged at a height such that the glass sheets (1) ejected from the shaping bed (6) strike, by way of their front lower end edge (16), against the upper part of said roller (14).

21. The machine as claimed in claim 19, characterized in that the overturning means consist of a roller (14a), preferably an idle roller, whose axis is parallel to that of the forwarding elements (7) of the shaping bed (6), arranged at a height such that the glass sheets (1) ejected from the shaping bed (6) are applied to said roller (14a) by way of their lower face, means being provided, such as air-blowing means, to tilt the hardened glass sheet (1) about said roller (14a).

22. The machine as claimed in claim 18, in which the path of travel of the glass sheets is designed to be

descending, characterized in that the means for taking over the glass sheets consist of recovery means in the form of a conveyor belt or roller conveyor (12).

23. The machine as claimed in one of claims 19 to 22, characterized in that the conveyor belts (12) are perforated or multi-strap conveyor belts.

24. The machine as claimed in one of claims 18 to 23, characterized in that the advancing elements (7) of the shaping bed (6) are chosen from among rods having an axis of symmetry, such as cylindrical, conical and waisted/barreled rods, and rotating on themselves, and cambered or curved elements which are surrounded by rotating tubular sleeves, the shapes of said advancing elements (7) being able to change along the shaping zone (15) of the shaping bed (6).

25. The machine as claimed in one of claims 18 to 24, characterized in that backing rollers (9) are associated with the advancing elements (7) of the shaping bed (6) in every zone thereof in which there is a requirement to retain the glass sheets (1).

26. The machine as claimed in one of claims 18 to 25, characterized in that it comprises means (9) for tempering or cooling the glass sheets once they have been shaped, said means consisting particularly of tempering blow-boxes each comprising nozzles arranged in arrays and directed between two adjacent forwarding elements (7) of the shaping bed (6).

27. The machine as claimed in one of claims 18 to 26, characterized in that it additionally comprises at least one nozzle for continuously blowing in air, arranged at a point on the line of travel of the sheets (1) after the sheets (1) have begun to be shaped and before they enter the cooling or tempering zone (8), the nozzle or nozzles being arranged so that air is

blown asymmetrically onto said sheets (1) and adjusted so that the blowing of air influences the final concavity of the bent glass sheets (1) by comparison with the concavity that the final bending would have given without said blowing.

28. Bent glass sheets obtained or capable of being obtained by the method as defined in one of claims 1 to 17.